

List of Claims

1. (currently amended) A turbocharger life determining system, comprising:

a turbocharger;

at least one compressor inlet pressure sensor;

at least one compressor outlet pressure sensor;

an electronic control module in communication with the sensors and including, means for monitoring at least one of fatigue and creep of at least one component of the turbocharger, at least in part, by sensing at least one parameter correlated to an estimated turbocharger rotational speed, and the means for monitoring including at least one of: a means for storing data associated with a plurality of turbocharger speed transition cycles, and a means for storing data associated with an amount of time the turbocharger operates at a plurality of pressure ratios; and

means for comparing at least one of the monitored fatigue and the monitored creep to a predetermined fatigue criteria and a predetermined creep criteria, respectively.

2. (previously presented) The turbocharger life determining system of claim 1 including at least one of an engine speed sensor, a compressor inlet temperature sensor, and a turbine inlet temperature sensor being in communication with the electronic control module.

3. (cancelled)

4. (cancelled)

5. (currently amended) The turbocharger life determining system of claim 1 means for comparing ~~at least one of~~ a monitored fatigue and a monitored creep with ~~at least one of~~ a predetermined fatigue criteria and predetermined creep criteria, respectively.

6. (cancelled)

7. (cancelled)

8. (cancelled)

9. (cancelled)

10. (cancelled)

11. (cancelled)

12. (cancelled)

13. (cancelled)

14. (currently amended) A method of determining a life of a turbocharger comprising the steps of:

monitoring at least one of fatigue and creep of at least one component of the turbocharger, at least in part, by sensing at least one parameter correlated to an estimated turbocharger rotational speed;

the monitoring step including at least one of: storing data associated with a plurality of turbocharger speed transition cycles, and storing data associated with an amount of time the turbocharger operates at a plurality of pressure ratios; and

comparing at least one of the monitored fatigue and the monitored creep to a predetermined fatigue criteria and a predetermined creep criteria, respectively.

15. (currently amended) The method of claim 14 wherein the step of monitoring includes a step of monitoring material degradation of at least one component of the turbocharger, at least in part, by monitoring at least one: a plurality of speed

transition cycle ranges, and a plurality of temperature range/pressure ratio range combinations, of compressor inlet temperature and turbine inlet temperature.

16. (currently amended) The method of claim 14 wherein the step of monitoring includes a step of calculating a ratio relationship between compressor inlet pressure and compressor outlet pressure; and-
storing data associated with each of a plurality of pressure ratio ranges.

17. (currently amended) The method of claim 16 wherein the step of monitoring includes a step of sensing at least one of engine speed, compressor inlet temperature, and turbine inlet temperature; and-
storing data associated with each of a plurality of compressor inlet temperature ranges.

18. (cancelled)

19. (currently amended) The method of claim 16 including a step of indicating when at least one of the monitored fatigue and creep, which is a summation of data, exceeds a predetermined fatigue data and creep data, respectively.

20. (currently amended) The method of claim 16 including a step of recording at least one of the monitored fatigue, the monitored creep and a calculated cumulative stress value for the turbocharger ~~on at least one of the turbochargers, an engine associated with the turbocharger, and in~~ a database including identifying turbocharger information.

21. (new) The turbocharger life determining system of claim 1 including the means for monitoring fatigue that includes the means for storing data associated with a plurality of turbocharger speed transition cycles; and

means for determining a fatigue stress damage for each turbocharger speed transition cycle

22. (new) The turbocharger life determining system of claim 21 wherein the fatigue stress damage for each turbocharger speed transition cycle is based upon a size of a speed transition cycle and pressure ratios associated with the speed transition cycle.

23. (new) The turbocharger life determining system of claim 22 including means for storing a summation of fatigue stress damages for a plurality of turbocharger speed transition cycles.

24. (new) The turbocharger life determining system of claim 1 including the means for monitoring creep that includes means for storing data associated with an amount of time the turbocharger operates at a pressure ratio; and
means for determining a creep stress damage for each amount of time.

25. (new) The turbocharger life determining system of claim 24 wherein the creep stress damage for each amount of time is based upon compressor inlet temperature and the pressure ratio for the amount of time.

26. (new) The turbocharger life determining system of claim 25 including means for storing a summation of creep stress damages for a plurality of amounts of time.

27. (new) The method of claim 14 including the step of storing data associated with the plurality of turbocharger speed transition cycles; and
determining a fatigue stress damage for each turbocharger speed transition cycle.

28. (new) The method of claim 27 wherein the determining step is based on a size of a speed transition cycle and pressure ratios associated with the speed transition cycle; and

summing fatigue stress damages for a plurality of turbocharger speed transition cycles.

29. (new) The method of claim 14 including the step of storing data associated with the amount of time the turbocharger operates in a plurality of pressure ratios; and

determining a creep stress damage for each amount of time.

30. (new) The method of claim 29 wherein the determining step is based on a compressor inlet temperature and the pressure ratio for the amount of time; and

storing a summation of creep stress damages for a plurality of amounts of time.

31. (new) The method of claim 14 wherein the monitoring step includes monitoring fatigue and creep.